

TECHNICAL MEMORANDUM

gdc

BIOASSAY TESTING – JOINT CANNERY OUTFALL EFFLUENT SEPTEMBER 2007 SAMPLING

Prepared For: StarKist Samoa (NPDES Permit AS0000019)
COS Samoa Packing (NPDES Permit AS0000027)

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SUMMARY

The NPDES permits for StarKist Samoa and COS Samoa Packing require semi-annual whole effluent toxicity testing. The test was conducted for the 2007 tradewind season using mysid shrimp and effluent samples collected September 4th and 5th, 2007. Results indicated an LC₅₀ of 39.4% effluent. This is within the range of previous tests. The result represents effluent toxicity of 2.5 TUa (acute toxicity units). Based on initial dilution modeling for critical conditions¹, the toxicity will be reduced to non-toxic levels (0.3 TUa) within 2.3 meters of the discharge, within 2 seconds, and less than 0.6 m above the diffuser or approximately 53 m below the water surface. This is well within the zone of initial dilution (ZID) for critical conditions. At the edge of the ZID the toxicity is reduced to less than 0.01 TUa.

¹ See "Request for Water Quality Certification and the Definition of Mixing Zones". **gdc**, 28 June 2007

INTRODUCTION

This memorandum presents the results of the supplementary bioassay testing of the Joint Cannery Outfall effluent sample that was collected in September 2007². The testing is required by the NPDES Permits that became effective in January 2001. The September 2007 test is the thirty-first test conducted since toxicity testing of the Joint Cannery Outfall effluent began in 1993³.

Study Objectives

Section D.1 of the StarKist Samoa and COS Samoa Packing NPDES Permits requires that semiannual definitive acute bioassays (96-hour static bioassays) be conducted on the cannery effluent. The purpose of these tests is to determine whether, and at what effluent concentration, acute toxicity may be detected for the combined joint cannery effluent discharge into Pago Pago Harbor.

Study Approach

The U.S. Environmental Protection Agency (USEPA) has conducted a number of reviews of the effluent sampling, analysis, and bioassay tests conducted in the past. All comments from USEPA have been incorporated into the sampling and sample handling standard operating procedures (SOP) or have been incorporated into the procedures used by the laboratory doing the test. The comments, responses, and SOP have been documented in previous reports.

The NPDES permit conditions require that the bioassay tests be conducted with the white shrimp, *Penaeus vannami* (postlarvae). In the event *Penaeus vannami* is not available at the time of the tests, the permit specifies the substitute species, *Mysidopsis bahia*, which now has been renamed *Americanamysis bahia*. For the September 2007 samplings, *Penaeus vannami* was not available and *Americanamysis bahia* was used.

Effluent samples were collected from the StarKist Samoa and COS Samoa Packing facilities at three hour intervals over a 24-hour period. The acute effluent bioassay test was conducted using a combined, flow-weighted, composite effluent sample made up from the effluent samples from both canneries, as allowed by the NPDES permit conditions. This combined effluent bioassay is representative of the wastewater discharged from the joint cannery outfall to Pago Pago Harbor.

² The semi-annual joint cannery outfall effluent bioassay tests are performed during the Non-Tradewind and Tradewind oceanographic seasons.

³ Testing was not conducted during 1999. Extra tests using two organisms were conducted in March 1995 and February 1996. A supplementary test was conducted in May 2006.

EFFLUENT SAMPLING METHODS

The September 2007 effluent samples were collected between 09:00 on 4 September 2007 and 06:00 on 5 September 2007. A flow-weighted composite sample of final effluent was created from both the StarKist Samoa and COS Samoa Packing effluent discharges. Samples were collected from the established effluent sampling sites. Detailed sampling procedures are described in the SOP for cannery effluent sampling.

A total of eight grab samples were collected into 1-gallon plastic cubitainers at each cannery. Samples were collected at approximately three-hour intervals over the 24-hour period. The samples were stored on ice or in a refrigerator until the completion of the 24-hour sampling period. After all samples were collected a 5-gallon flow-proportioned composite sample was prepared. The grab sample collection times, effluent flow rates, and the relative effluent flow volumes calculated from plant flow records are summarized in Table 1. The relative effluent flow volumes were used to prepare the final composite sample, which was shipped to the laboratory for testing.

A 5-gallon cubitainer containing the composite sample was packed on ice in an ice chest for shipment to the laboratory. A chain-of-custody form for the sample was completed and sealed into a zip-lock bag and taped inside the lid of the ice chest. The sample was shipped via DHL to the testing laboratory. The chain-of-custody form and the DHL waybill for the test are provided in Attachment I.

Table 1
StarKist Samoa and COS Samoa Packing
24-hour Composite Effluent Sample for Bioassay Testing
September 2007 Sample

Grab Sample Number	COS Samoa Packing		StarKist Samoa		Percent of Total Flow	
	Sampling Time	Effluent Flow (mgd)	Sampling Time	Effluent Flow (mgd)	Samoa Packing	StarKist Samoa
4 September 2007						
1	09:00	0.76	09:00	1.17	4.66	7.17
2	12:00	0.76	12:00	1.33	4.66	8.16
3	15:00	0.72	15:00	1.39	4.41	8.50
4	18:00	0.76	18:00	1.28	4.66	7.81
5	21:00	0.72	21:00	1.22	4.41	7.49
5 September 2007						
6	00:00	0.82	00:00	1.28	5.02	7.82
7	03:00	0.88	03:00	1.17	5.39	7.17
8	06:00	0.84	06:00	1.27	5.15	7.49
Total		6.26 ^A		17.34 ^A	38.4%	61.6%
Mean		0.78		1.23	Total = 100%	
^A Numerical total of column for calculation purposes. Total flow over a 24-hour period will be approximately the calculated mean.						

BIOASSAY TESTING PROCEDURES

EnviroSystems, Inc. located in Hampton, New Hampshire conducted the bioassay tests. The testing procedures and results of the bioassay tests are provided in the laboratory report included as Attachment II. This report summarizes the 96-hour acute bioassay tests conducted with reference to the USEPA document Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms (EPA-821-R-02-012), 2002 as the source of methods for conducting the test. The bioassay tests were conducted considering and including USEPA's comments on previous bioassay tests, as documented in previous reports.

The test organisms were ≤ 5 days old and the test temperature was to be held at a nominal 20 °C. The actual temperatures ranged between 19°C and 21°C. Salinity was adjusted to 25 ppt at the start of the test and ranged between 23 and 28 ppt.

Demonstrated potential for a lethal immediate dissolved oxygen demand (IDOD) and a delayed dissolved oxygen demand spike (DDOD) had been discussed and documented in previous technical memoranda, which describe the first two tests conducted in 1993. Therefore, following an EPA approved modified testing protocol; all of the bioassay test chambers should be continuously aerated during the bioassay tests to maintain adequate levels of dissolved oxygen (DO)⁴. The test should also be renewed with pre-oxygenated effluent sample at 48 hours.

The DO levels were between 4.4 mg/l and 7.4 mg/l for the initial portion of test and between 0.2 mg/l and 6.4 mg/l following renewal⁵. The DO levels were directly related to the percent effluent in the test chambers. Examination of the data indicates that the test results did not appear to be significantly influenced by DO concentrations.

Bioassay tests were carried out for effluent concentrations of 100, 75, 50, 25, 12.5, and 6.25 percent in seawater. Water quality was monitored daily and parameters measured included DO, pH, salinity, and temperature. Total residual chlorine and ammonia were also measured. Water quality data are provided in the Laboratory Report (Attachment II).

Reference toxicant tests using sodium dodecyl sulfonate (SDS) are conducted regularly by ESI with the relevant tests completed in September 2007 for which the results were within the acceptable range based on the 20 most recent laboratory reference toxicant tests.

⁴ The high initial dilution of the actual effluent discharge (>300:1) into the Harbor, in a very short time, eliminates any concern about IDOD effects in the receiving water.

⁵ Low DO values were recorded at the higher effluent concentrations. It appears the laboratory did not follow the aeration protocol previously developed. However, examination of the data (see Attachment II) indicates this does not appear to have had a significant effect on the results.

RESULTS AND DISCUSSION

The results for the September 2007 bioassay tests are included in Attachment II. The 96-hour LC₅₀ for the effluent tested was 39.4% percent effluent. The no observable effects concentration (NOEC) for the 96-hour bioassay was 12.5% effluent, and the least observable effects concentration (LOEC) was 25% percent. Results on a daily basis are summarized in Table 2.

Table 2
StarKist Samoa and COS Samoa Packing
Combined Effluent Bioassay Results
September 2007 Sampling

Exposure Time	Parameter		
	LC ₅₀	NOEC	LOEC
24 hours	53.35	25%	50%
48 hours	48.3%	12.5%	25%
72 hours	46.4%	12.5%	25%
96 hours	39.4%	12.5%	25%

Comparison to Previous Tests

Table 3 summarizes the results of the effluent bioassay tests for the samples collected in the September 2007 sampling compared to the previous bioassay tests. Figure 1 summarizes the LC₅₀ for the mysid and penaeid tests done since February 1993. Figure 2 presents the range of LC₅₀ results for mysids tests conducted since 1994. The LC₅₀, NOEC, and LOEC are within the range obtained from previous tests where *Americamysis bahia* (*Mysidopsis bahia*) was used in place of *Penaeus vannami*.

Conclusions

The bioassay tests for the Joint Cannery Outfall effluent for September 2007 indicate that effluent toxicity levels are not of concern. The time scale of the mixing of the effluent with the receiving water is on the order of seconds to achieve dilutions that will eliminate possible toxic effects as reflected by the bioassay results. The discharge is located in about 180 feet of water and the effluent toxicity tests indicate that the discharge is diluted to non-toxic levels immediately after discharge and well within the initial dilution plume.

For the September 2007 test the LC₅₀ of 39.4% corresponds to 2.54 acute toxicity units (TU_a). A dilution of less than 8:1 will reduce the toxicity to less than 0.3 TU_a, which is considered the acceptable level for the protection of aquatic life. The JCO achieves an initial dilution, under critical conditions of greater than 300:1. Therefore, at the edge of the zone of initial dilution (ZID) the acute toxicity is less than 0.01 TU_a for the LC₅₀ documented in the September 2007 test.

Bioassay Testing – Joint Cannery Outfall Effluent

September 2007 Sampling

Table 3
StarKist Samoa and COS Samoa Packing
Combined Effluent Bioassay Results

Date	Species	Parameters		
		LC ₅₀	NOEC	LOEC
2/93	<i>Penaeus vannami</i>	4.8% ¹	3.1%	6.25%
10/93	<i>Penaeus vannami</i>	15.67%	3.1%	6.25%
2/94	<i>Penaeus vannami</i>	15.76%	<1.6%	1.6%
10/94	<i>Mysidopsis bahia</i> ²	31.2%	25%	50%
3/95	<i>Penaeus vannami</i>	14.8%	6.25%	12.5%
3/95	<i>Mysidopsis bahia</i> ³	10.8%	6.25%	12.5%
2/96	<i>Penaeus vannami</i>	>50%	>50%	>50%
2/96	<i>Mysidopsis bahia</i> ³	28.36%	12.5%	25%
3/96	<i>Penaeus vannami</i>	44.4%	25%	50%
11/96	<i>Penaeus vannami</i>	7.11%	3.1%	6.25%
03/97	<i>Penaeus vannami</i>	39.36%	12.5%	25%
09/97	<i>Penaeus vannami</i> ⁴	12.3%	6.25%	12.5%
06/98	<i>Mysidopsis bahia</i> ²	17.2%	6.25%	12.5%
11/98	<i>Mysidopsis bahia</i> ²	15%	6.25%	12.5%
02/00	<i>Mysidopsis bahia</i> ²	20%	6.25%	12.5%
08/00	<i>Mysidopsis bahia</i> ²	17.1%	3.1%	6.25%
03/01	<i>Americamysis bahia</i> ^{2,5}	13.8%	12.5%	25%
10/01	<i>Americamysis bahia</i> ^{2,6}	37.5%	25%	50%
3/02	<i>Americamysis bahia</i> ^{2,6}	16.1%	12.5%	25%
8/02	<i>Americamysis bahia</i> ^{2,6}	10.23%	6.25%	12.5%
03/03	<i>Americamysis bahia</i> ^{2,6}	28.4%	25%	50%
08/03	<i>Americamysis bahia</i> ^{2,6}	43.2%	25%	50%
02/04	<i>Americamysis bahia</i> ^{2,6}	>50%	50%	>50%
09/04	<i>Americamysis bahia</i> ^{2,6}	>50%	50%	>50%
03/05	<i>Americamysis bahia</i> ^{2,6}	48.5%	25%	50%
08/05	<i>Americamysis bahia</i> ^{2,6}	>50%	50%	>50%
03/06	<i>Americamysis bahia</i> ^{2,6}	35.6% ⁷	25%	50%
05/06	<i>Americamysis bahia</i> ^{2,6}	32.7% ⁷	12.5%	25%
11/06	<i>Americamysis bahia</i> ^{2,6}	43.1%	25%	50%
02/07	<i>Americamysis bahia</i> ^{2,6}	44.1%	25%	50%
09/07	<i>Americamysis bahia</i> ^{2,6}	39.4%	12.5%	25%

¹The February 1993 samples were not aerated until after the first day of the test. For subsequent tests the samples were aerated for the entire duration of the tests.

²*Mysidopsis bahia* used as substitutes because *Penaeus vannami* were not available: as directed and approved by USEPA.

³*Mysidopsis bahia* used in addition to *Penaeus vannami* as described in text of technical memorandums reporting test results. Only one species is required by the permit conditions.

⁴Stage 1 (3 mm) *Penaeus vannami* were used for testing because older Stage 7 and 8 (8-10 mm) *Penaeus vannami* were not available.

⁵*Mysidopsis bahia* renamed *Americamysis bahia*. Results indicate increased toxicity because of low DO in renewal concentrations as renewal water was not aerated prior to use

⁶*Mysidopsis bahia* renamed *Americamysis bahia*

⁷Results for this test depressed because aeration was not provided (see text).

Bioassay Testing – Joint Cannery Outfall Effluent

September 2007 Sampling

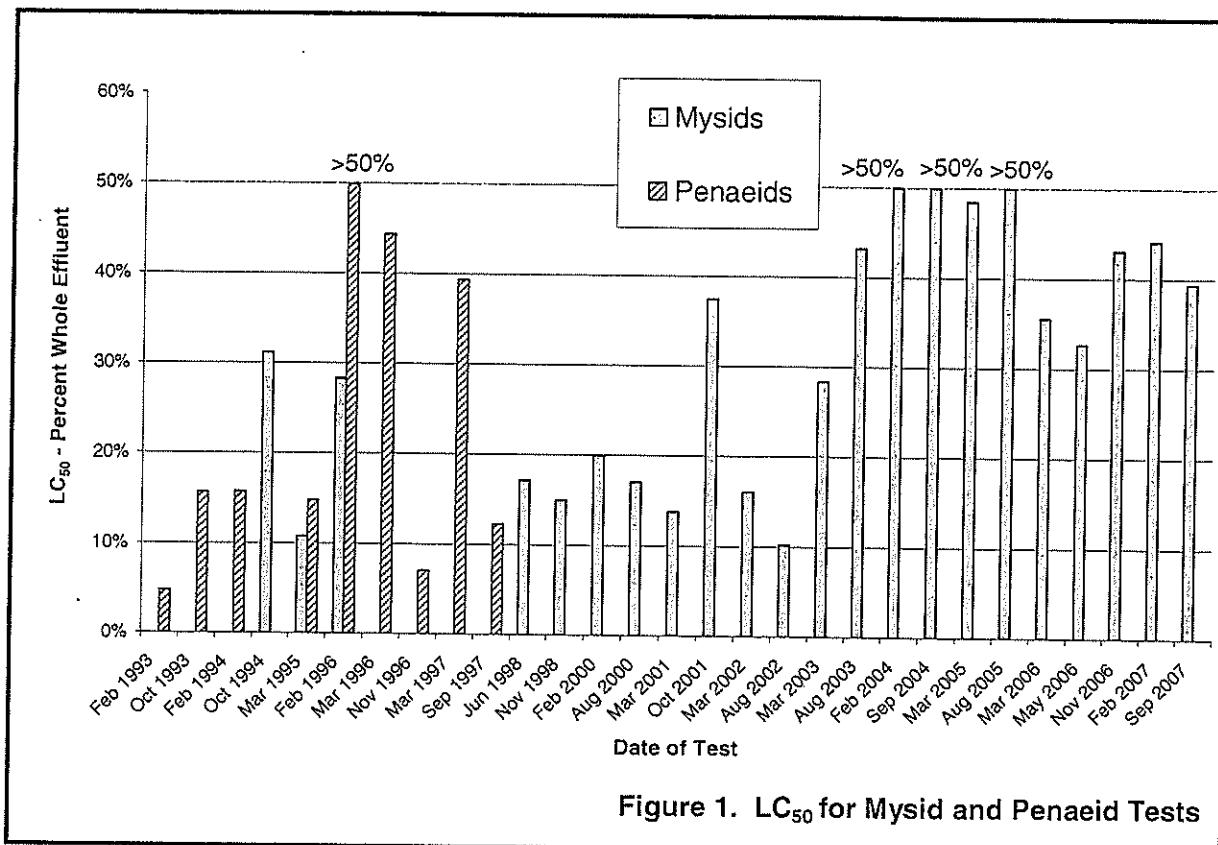


Figure 1. LC₅₀ for Mysid and Penaeid Tests

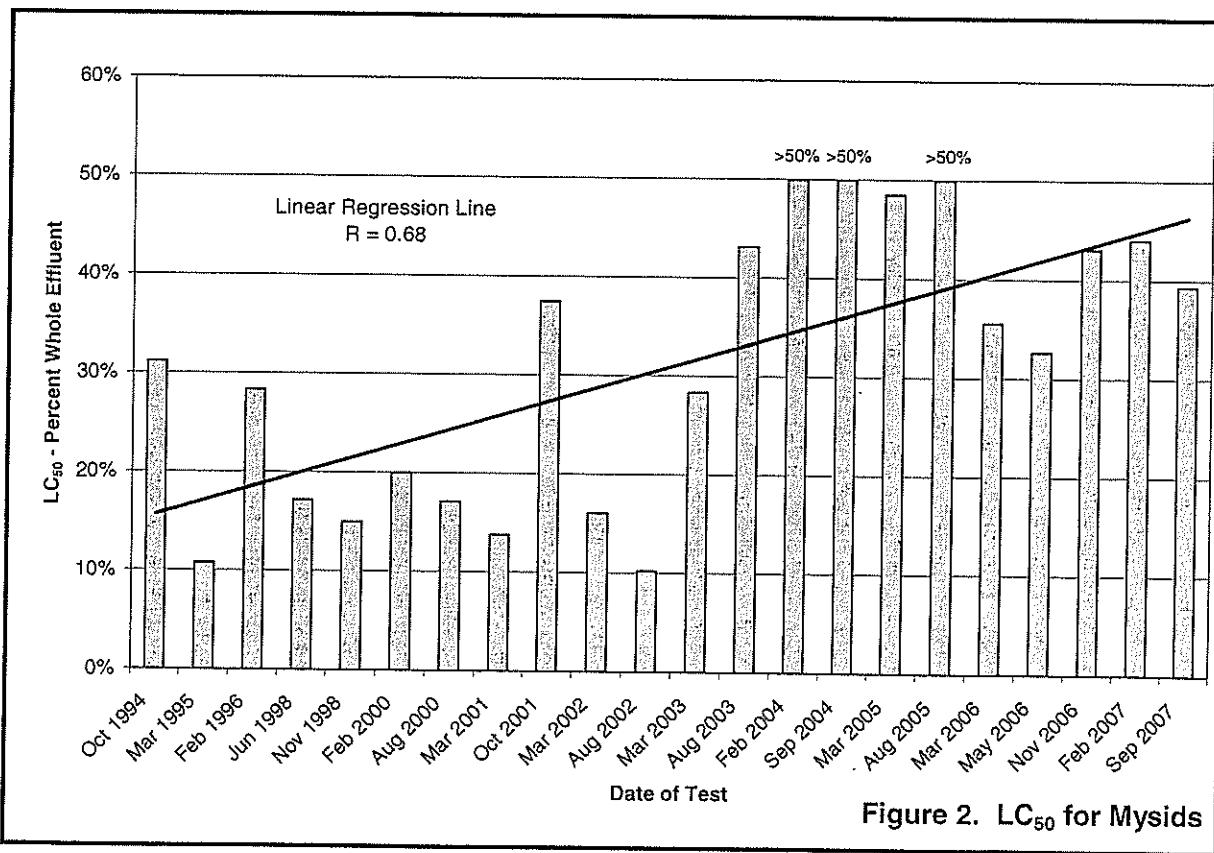


Figure 2. LC₅₀ for Mysids

ATTACHMENT I

Chain-of-Custody

ATTACHMENT II

**EnviroSystems, Inc. Laboratory Report
for September 2007 Sampling**

ATTACHMENT I

Chain-of-Custody

Process and Track your shipment online: <http://www.dhl-usa.com>

1-800-CALL-DHL in USA only

1 Payer account number and shipment value protection details

Charge to Shipper Receiver 3rd Party

Payer Account No.

Shipment Value Protection (see reverse)

Yes Declared Value for Carriage (in US \$)

Not all payment options are available in all countries.

2 From (Shipper)

Shipper's Account Number

Contact Name

Shipper's Reference (up to 35 characters)

MRGS - RW- EDC (07-TW)

Company Name

S MR KIST SANTA

Address

PAO PABD

AMERICAN SANTA

Post/Zip Code (required)

Phone, Fax, or E-mail (required)

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Shipment Air Washable

ORIGIN **DPL**

DESTINATION CODE **PR**

784 1699 751



8 Products & Services

DOMESTIC EXPRESS
 U.S. Express Envelope
 USA Overnight
 Other.....

WORLDWIDE EXPRESS
 Int'l Express Envelope
 Non-Deliverable
 Worldwide Flight
 Other.....

Service Options (extra charges may apply)
 Saturday Delivery
 Hold For Pickup^{**}
 Other.....

Not all products or service options are available to from all locations.

9 Dimensional Chargeable Weight

Dimensions (in inches)
Length _____ Width _____ Height _____

lbs

10 SERVICES

CHARGES

TOTAL

TRANSPORT COLLECT STICKER NO.

No.:

Type

Expires

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Date

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CHAIN OF CUSTODY

ATTACHMENT II

**EnviroSystems, Inc. Laboratory Report
for September 2007 Sampling**

**TOXICOLOGICAL EVALUATION
OF A TREATED EFFLUENT:
BIOMONITORING SUPPORT FOR A NPDES PERMIT
September 2007**

American Samoa Joint Cannery Outfall

Prepared For

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September 2007
Reference Number GDC-Samoa16289-07-09

STUDY NUMBER 16289

EXECUTIVE SUMMARY

The following summarizes the results of acute exposure bioassays performed from September 6-10, 2007 in support of the NPDES biomonitoring requirements of the American Samoa Joint Cannery Outfall. The 96 hour acute definitive assay was conducted using the marine species, *Americanamysis bahia*.

Samples were received under chain of custody in good order. All sample receipt, test conditions and control endpoints were within protocol specifications except where otherwise noted. The results presented in this report relate only to the samples described on the chain(s) of custody and sample receipt log(s).

Results from the acute exposure assays are summarized in the following matrix.

Acute Toxicity Evaluation

Species	Exposure	LC-50	NOEC	LOEC	Assay Meets Protocol Requirements
<i>Americanamysis bahia</i>	24-Hours	53.3%	25%	50%	Yes
	48-Hours	48.3%	12.5%	25%	Yes
	72-Hours	46.4%	12.5%	25%	Yes
	96-Hours	39.4%	12.5%	25%	Yes

**TOXICOLOGICAL EVALUATION
OF A TREATED EFFLUENT;
BIOMONITORING SUPPORT FOR A NPDES PERMIT**
September 2007

American Samoa Joint Cannery Outfall

1.0 INTRODUCTION

This report presents the results of an acute toxicity test conducted on an effluent sample collected from the American Samoa Joint Cannery Outfall. Testing was based on programs and protocols developed by the US EPA (2002) and involved conducting 96 hour acute static renewal toxicity tests with the marine species, *Americamysis bahia*. Testing was performed at EnviroSystems, Incorporated (ESI), Hampton, New Hampshire in accordance with the provisions of the NELAC Standards (2000).

Acute toxicity tests involve preparing a series of concentrations by diluting effluent with control water. Groups of test organisms are exposed to each effluent concentration and a control for a specified period. In acute tests, mortality data for each concentration are used to calculate (by regression) the median lethal concentration, or LC-50, defined as the effluent concentration which kills half of the test organisms. Samples with high LC-50 values are less likely to cause significant environmental impact. The acute no observed effect concentration (NOEC) and lowest observed effect concentration (LOEC) document the highest and lowest effluent concentrations that have no impact and a significant impact on the test species, respectively.

2.0 MATERIALS AND METHODS

2.1 General Methods

Toxicological and analytical protocols used in this program follow procedures primarily designed by the EPA to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms, and for the analysis of water samples. See Section 4.0 for a list of references.

2.2 Test Species

Every attempt was made to acquire the species, *Penaeus vannami*, as this is the preferred organism under the Cannery's permit. ESI was unable to obtain reasonably priced *P. vannami*. Due to the exorbitant expense, the decision was made to use an alternate species, *Americamysis bahia*.

A. bahia, ≤5 days old, were obtained from Aquatic Research Organisms, Hampton, New Hampshire. Test organisms were transferred to test chambers by large bore pipet, minimizing the amount of water added to test solutions.

2.3 Effluent and Dilution Water

The effluent sample used in the assay was identified as "JC0-07TW". Sample collection information is provided in Table 1. Upon receipt, the sample was stored at 4°C. All sample material used in the assay was warmed to 20±1°C prior to preparing test solutions. Total residual chlorine (TRC) was measured using amperometric titration (MDL 0.05 mg/L). As the effluent sample contained <0.05 mg/L, TRC dechlorination with sodium thiosulfate was not required (EPA 2002). Aliquots of the undiluted effluent sample were collected for ammonia analysis when the sample arrived and again prior to renewal. Upon arrival, the effluent sample had a salinity of 9.0‰. Salinity of the effluent was increased to 25‰ by the addition of artificial sea salts. Test concentrations for the assays were 100%, 75%, 50%, 25%, 12.5%, and 6.25% effluent with a laboratory water diluent control.

The dilution water used in this assay was collected from the sea water system at ESI. The water is pumped in daily from the Hampton Estuary on the flood tide, filtered through a high volume sand filter, and

stored in 3000 gallon polyethylene tanks. The water is classified as Class SA-1 by the State of New Hampshire, and has been used to culture test organisms for over 20 years. Sea water used in the assay had a salinity of $25\pm2\%$ and a TRC of <0.05 mg/L.

2.4 Acute Toxicity Tests

The 96 hour acute static renewal toxicity test was conducted at $20\pm2^{\circ}\text{C}$ with a photoperiod of 16:8 hours light:dark. Test chambers for the acute assays were 250 mL glass beakers containing 200 mL test solution in each of 5 replicates, with 10 organisms/replicate. Survival, dissolved oxygen, pH, salinity and temperature were measured daily in all replicates. Test solutions were renewed after 48 hours using effluent from the start sample. Mysid shrimp were fed daily with <24 hour old brine shrimp.

2.5 Data Analysis

Survival data were analyzed at 24 hour intervals to assess toxicity using CETIS, Comprehensive Environmental Toxicity Testing System, software. The program computes acute exposure endpoints based on EPA decision tree guidelines specified in individual test methods. For acute exposure endpoints statistical significance was accepted at $\alpha <0.05$.

2.6 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. See Table 2 for details.

3.0 RESULTS

Results of the acute exposure bioassay conducted using the mysid shrimp, *A. bahia*, are summarized in Tables 3A and 3B. Effluent and dilution water characteristics are presented in Table 4. Table 5 provides a summary of historic data associated with the discharge. Support data are included in Appendix A.

Minimum test acceptability criteria require $\geq 90\%$ survival in the control concentration. As the laboratory water diluent control met or exceeded this protocol specification, results associated with the assay indicate healthy test organisms were used and that the dilution water had no adverse impact on the outcome of the assay. These data are considered as valid for evaluating impacts associated with the effluent sample.

4.0 LITERATURE CITED

- APHA. 1998. *Standard Methods for the Examination of Water and Wastewater*, 20th Edition. Washington D.C.
- National Environmental Laboratory Accreditation Conference: Quality Systems*. Chapter 5. June 2000.
- U.S. EPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fifth Edition. EPA-821-R-02-012.

TABLE 1. Summary of Sample Collection Information. American Samoa Joint Cannery Outfall Effluent Evaluation. September 2007.

Sample Description	Collection			Receipt		Arrival Temp °C
	Type	Date	Time	Date	Time	
EFFLUENT	Comp	09/05/07	No data	09/18/07	1300	20*

* Upon receipt, the temperature was outside of the range of 4±2°C recommended by the protocol.

TABLE 2. Summary of Reference Toxicant Data. American Samoa Joint Cannery Outfall Effluent Evaluation. September 2007.

Date	Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
<i>A. bahia</i>					
09/04/07	Survival	LC-50	25.1	21.2	6.26 - 26.18 SDS (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays

TABLE 3A. Summary of Acute Evaluation Results. American Samoa Joint Cannery Outfall Effluent Evaluation. September 2007.

Exposure Period	LC-50 (95% Limits)	ENDPOINT SUMMARY		NOEC	LOEC	METHOD
		METHOD				
24 Hours	53.3% (47.9 - 59.3)	Speraman-Karber, Trimmed		25%	50%	Dunnett's Multiple Comparison
48 Hours	48.3% (42.9 - 54.5)	Speraman-Karber, Trimmed		12.5%	25%	Dunnett's Multiple Comparison
72 Hours	46.4% (41.5 - 52.0)	Speraman-Karber, Trimmed		12.5%	25%	Dunnett's Multiple Comparison
96 Hours	39.4% (26.6-58.9)	Speraman-Karber, Trimmed		12.5%	25%	Dunnett's Multiple Comparison

TABLE 3B. Summary of Acute Evaluation Results. American Samoa Joint Cannery Outfall Effluent Evaluation. September 2007.

Effluent Concentration	Exposure	Reps	Mean	Minimum	Maximum	Std Dev	CV
Lab Control	24 Hr	5	100.0%	100.0%	100.0%	0.000	0.00%
	48 Hr	5	98.0%	90.0%	100.0%	0.045	4.56%
	72 Hr	5	96.0%	90.0%	100.0%	0.055	5.71%
	96 Hr	5	96.0%	90.0%	100.0%	0.055	5.71%
6.25%	24 Hr	5	100.0%	100.0%	100.0%	0.000	0.00%
	48 Hr	5	96.0%	90.0%	100.0%	0.055	5.71%
	72 Hr	5	94.0%	90.0%	100.0%	0.055	5.83%
	96 Hr	5	92.0%	80.0%	100.0%	0.084	9.09%
12.5%	24 Hr	5	96.0%	90.0%	100.0%	0.055	5.71%
	48 Hr	5	92.0%	80.0%	100.0%	0.084	9.09%
	72 Hr	5	92.0%	80.0%	100.0%	0.084	9.09%
	96 Hr	5	90.0%	80.0%	100.0%	0.071	7.86%
25.0%	24 Hr	5	90.0%	80.0%	100.0%	0.071	7.86%
	48 Hr	5	84.0%	80.0%	90.0%	0.055	6.52%
	72 Hr	5	82.0%	80.0%	90.0%	0.045	5.45%
	96 Hr	5	74.0%	40.0%	90.0%	0.195	26.34%
50.0%	24 Hr	5	74.0%	60.0%	80.0%	0.089	12.09%
	48 Hr	5	68.0%	60.0%	80.0%	0.084	12.30%
	72 Hr	5	66.0%	60.0%	80.0%	0.089	13.55%
	96 Hr	5	48.0%	30.0%	60.0%	0.110	22.82%
75.0%	24 Hr	5	14.0%	0.0%	30.0%	0.134	95.83%
	48 Hr	5	14.0%	0.0%	30.0%	0.134	95.83%
	72 Hr	5	0.0%	0.0%	0.0%	0.000	0.00%
	96 Hr	5	0.0%	0.0%	0.0%	0.000	0.00%
100%	24 Hr	5	4.0%	0.0%	20.0%	0.089	223.61%
	48 Hr	5	2.0%	0.0%	10.0%	0.045	223.61%
	72 Hr	5	0.0%	0.0%	0.0%	0.000	0.00%
	96 Hr	5	0.0%	0.0%	0.0%	0.000	0.00%

TABLE 4. Summary of Effluent and Diluent Characteristics. American Samoa Joint Cannery Outfall Effluent Evaluation. September 2007.

PARAMETER	UNITS	100% EFFLUENT	50% EFFLUENT	DILUENT
Salinity - As Received	%o	9.7	-	25
Salinity - After Salinity Adjustment	%o	26	26	-
pH - As Received	SU	6.28	-	7.83
pH - After Salinity Adjustment	SU	7.91	7.89	-
TRC - As Received	mg/L	<0.05	-	<0.05
Dissolved Oxygen - As Received	mg/L	0.7	-	7.1
Dissolved Oxygen - After Aeration	mg/L	7.5	7.5	-
Ammonia - As Received	mg/L as N	32	-	<0.1
Unionized Ammonia - As Received	mg/L as N	0.997	-	<0.002
Ammonia - Salinity Adjusted	mg/L as N	-	28	-
Unionized Ammonia - Salinity Adjusted	mg/L as N	-	0.835	-
Ammonia - at 48 Hours	mg/L as N	14	6.5	<0.1
Unionized Ammonia - at 48 Hours	mg/L as N	0.606	0.314	<0.003

TABLE 5. Summary of StarKist Samoa and COS Samoa Packing Combined Effluent Bioassay Results. American Samoa Joint Cannery Outfall Effluent Evaluation. September 2007.

Date	Species	96-Hour Endpoints		
		LC-50	NOEC	LOEC
02/93 ¹	<i>Penaeus vannami</i>	4.8%	3.1%	6.25%
10/93 ¹	<i>Penaeus vannami</i>	15.67%	3.1%	6.25%
02/94 ¹	<i>Penaeus vannami</i>	15.76%	<1.6%	1.6%
10/94 ¹	<i>Americamysis bahia</i>	31.2%	25.0%	50.0%
03/95 ¹	<i>Penaeus vannami</i>	14.8%	6.25%	12.5%
03/95 ¹	<i>Americamysis bahia</i>	10.8%	6.25%	12.5%
02/96 ¹	<i>Penaeus vannami</i>	>50.0%	>50.0%	>50.0%
03/96 ¹	<i>Penaeus vannami</i>	44.4%	25.0%	50.0%
11/96 ¹	<i>Penaeus vannami</i>	7.11%	3.1%	6.25%
03/97 ¹	<i>Penaeus vannami</i>	39.36%	12.5%	25.0%
09/97 ¹	<i>Penaeus vannami</i>	12.3%	6.25%	12.5%
06/98 ¹	<i>Americamysis bahia</i>	17.2%	6.25%	12.5%
11/98 ¹	<i>Americamysis bahia</i>	15.0%	6.25%	12.5%
02/00 ¹	<i>Americamysis bahia</i>	20.0%	6.25%	12.5%
08/00 ¹	<i>Americamysis bahia</i>	17.1%	3.1%	6.25%
03/01 ²	<i>Americamysis bahia</i>	13.81%	12.5%	25.0%
03/02 ²	<i>Americamysis bahia</i>	16.13%	12.5%	25.0%
08/02 ²	<i>Americamysis bahia</i>	10.23%	6.25%	12.5%
03/03 ²	<i>Americamysis bahia</i>	28.4%	25.0%	50.0%
08/03 ²	<i>Americamysis bahia</i>	43.2%	25.0%	50.0%
03/04 ²	<i>Americamysis bahia</i>	>50.0%	50.0%	>50.0%
10/04 ²	<i>Americamysis bahia</i>	>50.0%	50.0%	>50.0%
03/05 ²	<i>Americamysis bahia</i>	48.5%	25.0%	50.0%
10/05 ²	<i>Americamysis bahia</i>	>50.0%	50.0%	>50.0
03/06 ²	<i>Americamysis bahia</i>	36.6%	25.0%	50.0%
11/06 ²	<i>Americamysis bahia</i>	43.1%	25.0%	50.0%
03/07 ²	<i>Americamysis bahia</i>	44.1%	25.0%	50.0%
09/07 ²	<i>Americamysis bahia</i>	39.4%	12.5%	25.0%

Notes:

¹. Assays conducted by Advanced Biological Testing, Inc., Rohnert Park, California

². Assays conducted by EnviroSystems, Inc., Hampton, New Hampshire

APPENDIX A
DATA SHEETS
STATISTICAL SUPPORT

Contents	Number of Pages
Methods Used in NPDES Permit Biomonitoring Testing	1
A. <i>bahia</i> Acute Bioassay Data Summary	3
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METHODS USED IN NPDES PERMIT BIOMONITORING TESTING

Parameter	Method
Acute Exposure Bioassays	
<i>Ceriodaphnia dubia, Daphnia pulex</i>	EPA-821-R-02-012
<i>Pimephales promelas</i>	EPA-821-R-02-012
<i>Americamysis bahia</i>	EPA-821-R-02-012
<i>Menidia beryllina, Cyprinodon variegatus</i>	EPA-821-R-02-012
Chronic Exposure Bioassays	
<i>Ceriodaphnia dubia</i>	EPA-821-R-02-013, 1002.0
<i>Pimephales promelas</i>	EPA-821-R-02-013, 1000.0
<i>Cyprinodon variegatus</i>	EPA-821-R-02-014, 1004.0
<i>Menidia beryllina</i>	EPA-821-R-02-014, 1006.0
<i>Arbacia punctulata</i>	EPA-821-R-02-014, 1008.0
<i>Champia parvula</i>	EPA-821-R-02-014, 1009.0
Trace Metals:	
ICP Metals	EPA 200.7/SW 6010
Hardness	Standard Methods 20 th Edition - Method 2340 B
Wet Chemistries:	
Alkalinity	EPA 310.2
Chlorine, Residual	Standard Methods 20 th Edition - Method 4500CLD
Total Organic Carbon	Standard Methods 20 th Edition - Method 5310C
Specific Conductance	Standard Methods 20 th Edition - Method 2510B
Nitrogen - Ammonia	Standard Methods 20 th Edition - Method 4500NH3G
pH	Standard Methods 20 th Edition - Method 4500H+B
Solids, Total (TS)	Standard Methods 20 th Edition - Method 2540.B
Solids, Total Suspended (TSS)	Standard Methods 20 th Edition - Method 2540D
Dissolved Oxygen	Standard Methods 20 th Edition - Method 4500-O G

ACUTE BIOASSAY DATA SUMMARY

STUDY: 16289

CLIENT: GH2M+HII- GDC

TEST ORGANISM: *A. bahia*

ORGANISM SUPPLIER/BATCH/AGE:

See Organism Culture Sheet

SAMPLE: American Samoa

DILUENT: LAB SALT

"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES

	TRC	AMM 0 HRS*	AMM 48 HRS*	pH	DO	Salinity
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EFFLUENT	DILUENT	See "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet				
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SALINITY ADJUSTMENT RECORD (IF APPLICABLE):

ML EFFLUENT + G SEA SALTS = 100% ACTUAL PERCENTAGE

CONC	REP	SURVIVAL	♦DISSOLVED OXYGEN (MG/L)†						PH (SU)	TEMPERATURE (°C)	SALINITY (ppt)	
			0	24	48	72	96	0				
LAB	A	10/10	10/10	7.4	7.2	7.0	6.4	7.3	6.8	7.4	7.76	7.80
B	10/10	10/10	7.4	7.2	7.1	6.3	7.3	6.8	7.5	7.84	7.85	7.98
C	10/10	9/9	7.4	7.2	6.4	6.3	7.3	6.8	7.6	7.85	7.70	7.81
D	10/10	10/10	7.4	7.2	6.9	6.2	7.5	6.7	7.80	7.86	7.87	7.80
E	10/10	9/9	7.4	7.2	7.1	6.5	7.5	6.5	7.85	7.87	7.91	7.86
6.25%	A	10/10	10/10	7.4	6.8	7.0	6.8	7.2	6.8	7.81	7.79	7.91
B	0/9	8/8	7.4	6.9	7.0	6.2	7.2	6.8	7.80	7.88	7.92	7.95
C	10/10	9/9	7.4	6.9	7.0	6.1	7.1	6.8	7.80	7.88	7.93	7.97
D	10/10	10/10	7.4	6.9	7.0	6.1	7.2	6.2	7.81	7.88	7.93	7.97
E	10/10	9/9	7.4	7.1	7.0	6.5	7.2	6.2	7.90	7.93	7.93	8.00
DATE	10/10/91	10/10/91	10/10/91	10/10/91	10/10/91	10/10/91	10/10/91	10/10/91	10/10/91	10/10/91	10/10/91	10/10/91
TIME	10:00	15:00	15:00	15:00	15:00	15:00	15:00	15:00	15:00	15:00	15:00	15:00
INITIALS	JW	JK	JK	JK	JK	JK	JK	JK	JK	JK	JK	JK
FED?	/	/	/	/	/	/	/	/	/	/	/	/

* - See: "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.

♦ - AERATE FIOR TO MIXING DILUTIONS - AERATE TEST CHAMBERS FROM START!

◊ - "Old" water qualities (prior to renewal)

☆ - "New" water qualities (post renewal)

ACUTE BIOASSAY DATA SUMMARY

** - See: "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.

ACUTE BIOASSAY DATA SUMMARY

STUDY: 160909		SAMPLE RECEIVED:		"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES																
CLIENT: Chem-Hill	TEST ORGANISM: A. bahia			TRC	AMM 0 HR*	AMM 48 HR*	pH	DO	Salinity											
SAMPLE: American Samoa	ORGANISM SUPPLIER:			EFFLUENT	"EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet															
DILUENT: LAB SALT	ORGANISM BATCH/AGE:	DILUENT	PH (SU)	TEMPERATURE (°C)												SALINITY (ppt)				
CONC	REP	SURVIVAL	♦DISSOLVED OXYGEN (MG/L)♦	0	24	48	72	96	0	24	48◊	72	96	0	24	48◊	72	96		
75%	A	10 3 3 0 -	7.5 5.5 6.1 1.8 6.2 -	7.81	7.49	6.18	7.69	8.24	-	20	20	21	19	-	26	24	27	26	27	
	B	10 2 2 0 -	7.5 4.4 6.3 1.7 6.2 -	7.46	7.10	8.03	7.62	8.27	-	26	20	20	21	20	-	26	26	27	26	27
	C	10 0 - -	7.5 5.2 - -	7.87	7.94	-	-	-	-	20	20	-	-	-	-	26	26	-	26	27
	D	10 0 - -	7.5 5.3 - -	7.81	7.81	-	-	-	-	20	20	-	-	-	-	26	26	-	26	27
	E	10 2 2 0 -	7.5 5.2 6.1 1.9 0.6 -	7.8	7.85	8.19	7.88	8.04	-	20	20	21	20	-	26	26	-	26	27	
100%	A	10 2 1 0 -	7.5 5.1 5.8 0.2 5.9 -	7.91	7.92	8.09	7.54	8.33	-	20	20	21	20	-	26	27	28	26	27	
	B	10 0 - -	7.5 5.1 - -	7.91	7.90	-	-	-	-	20	20	-	-	-	-	26	26	-	26	27
	C	10 0 0 -	7.5 4.9 - -	7.93	7.97	-	-	-	-	20	20	-	-	-	-	26	27	-	26	27
	D	10 0 - -	7.5 4.9 - -	7.94	7.90	-	-	-	-	20	20	-	-	-	-	26	27	-	26	27
	E	10 0 - -	7.5 4.9 - -	7.96	7.84	-	-	-	-	20	20	-	-	-	-	26	26	-	26	27
	DATE	160909 0919	0100 0921	0108	0109	0110	0110	0110	0110	0110	0110	0110	0110	0110	0110	0110	0110	0110	0110	0110
	TIME	1600 1535 1545	1510	1630	1515	1515	1620	1445												
	INITIALS	RM SS J	JB AK	JB	SS	JB	JB	AK												
	FED?	J	J	J	J	J	J	J												

* - See: "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.

* - AERATE PRIOR TO MIXING DILUTIONS - AERATE TEST CHAMBERS FROM START!

> - "Old" water qualities (prior to renewal)

< - "New" water qualities (post renewal)

CETIS Test Summary

Americamysis 96-h Acute Survival Test					EnviroSystems, Inc.
Test No:	15-7124-2542	Test Type:	Survival (96h)		Duration: 92h
Start Date:	18 Sep-07 04:10 PM	Protocol:	EPA/821/R-02-012 (2002)		Species: Americamysis bahia
Ending Date:	22 Sep-07 11:45 AM	Dil Water:	Laboratory Seawater		Source: ARO - Aquatic Research Organisms, N
Setup Date:	18 Sep-07 04:10 PM	Brine:	Generic commercial salts		
Sample No:	08-8155-1453	Material:	Food Processing Effluent		Client: GH2M-Hill GDC
Sample Date:	05 Sep-07 12:00 PM	Code:	16289		Project: Third Quarter WET Compliance Test
Receive Date:	18 Sep-07 01:00 PM	Source:	Joint Cannery Outfall - American Som		
Sample Age:	13d 4h (20 °C)	Station:	JCO-05TW		
Comparison Summary					
Analysis	Endpoint	NOEL	LOEL	ChV	MSDp
14-6627-3059	24h Proportion Survived	25	50	35.355	10.34%
06-6039-1529	48h Proportion Survived	12.5	25	17.678	10.73%
17-1111-6260	72h Proportion Survived	12.5	25	17.678	9.03%
08-7717-8615	96h Proportion Survived	12.5	25	17.678	13.46%
Point Estimate Summary					
Analysis	Endpoint	% Effect	Conc-%	95% LCL	95% UCL
20-3775-2891	24h Proportion Survived	50	53.29623	47.88733	59.31606
06-0206-0071	48h Proportion Survived	50	48.29816	42.79868	54.50429
07-7767-7499	72h Proportion Survived	50	46.42429	41.46905	51.97164
10-7368-7169	96h Proportion Survived	50	39.41403	34.41920	45.13371
Test Acceptability					
Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision
08-7717-8615	96h Proportion Survived	Control Response	0.96	0.9 - N/A	Passes acceptability criteria
10-7368-7169	96h Proportion Survived	Control Response	0.96	0.9 - N/A	Passes acceptability criteria

CETIS Test Summary

Report Date: 02 Oct-07 10:32 PM
 Link: 01-4072-5298

24h Proportion Survived Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
12.5		5	0.96000	0.90000	1.00000	0.02449	0.05477	5.71%
25		5	0.90000	0.80000	1.00000	0.03162	0.07071	7.86%
50		5	0.74000	0.60000	0.80000	0.04000	0.08944	12.09%
75		5	0.14000	0.00000	0.30000	0.06000	0.13416	95.83%
100		5	0.04000	0.00000	0.20000	0.04000	0.08944	223.61
48h Proportion Survived Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
6.25		5	0.96000	0.90000	1.00000	0.02449	0.05477	5.71%
12.5		5	0.92000	0.80000	1.00000	0.03742	0.08367	9.09%
25		5	0.84000	0.80000	0.90000	0.02449	0.05477	6.52%
50		5	0.68000	0.60000	0.80000	0.03742	0.08367	12.30%
75		5	0.14000	0.00000	0.30000	0.06000	0.13416	95.83%
100		5	0.02000	0.00000	0.10000	0.02000	0.04472	223.61
72h Proportion Survived Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	0.96000	0.90000	1.00000	0.02449	0.05477	5.71%
6.25		5	0.94000	0.90000	1.00000	0.02449	0.05477	5.83%
12.5		5	0.92000	0.80000	1.00000	0.03742	0.08367	9.09%
25		5	0.82000	0.80000	0.90000	0.02000	0.04472	5.45%
50		5	0.66000	0.60000	0.80000	0.04000	0.08944	13.55%
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
96h Proportion Survived Summary								
Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	0.96000	0.90000	1.00000	0.02449	0.05477	5.71%
6.25		5	0.92000	0.80000	1.00000	0.03742	0.08367	9.09%
12.5		5	0.90000	0.80000	1.00000	0.03162	0.07071	7.86%
25		5	0.74000	0.40000	0.90000	0.08718	0.19494	26.34%
50		5	0.48000	0.30000	0.60000	0.04899	0.10954	22.82%
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%

CETIS Analysis Detail

Americamysis 96-h Acute Survival Test							EnviroSystems, Inc.	
Test No:	15-7124-2542	Test Type:	Survival (96h)			Duration:	92h	
Start Date:	18 Sep-07 04:10 PM	Protocol:	EPA/821/R-02-012 (2002)			Species:	Americamysis bahia	
Ending Date:	22 Sep-07 11:45 AM	Dil Water:	Laboratory Seawater			Source:	ARO - Aquatic Research Organisms, N	
Setup Date:	18 Sep-07 04:10 PM	Brine:	Generic commercial salts					
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version		
24h Proportion Survived	Trimmed Spearman-Karber		01-4072-5298	01-4072-5298	02 Oct-07 10:30 PM	CETISv1.026		
Spearman-Karber Options					Point Estimates			
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	EC50/LC50	95% LCL	95% UCL	
Control Threshold	0	4.00%	1.726696	0.02323793	53.29623	47.88733	59.31606	
Data Summary								
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	50
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50
12.5		5	0.96000	0.90000	1.00000	0.01118	0.05477	48
25		5	0.90000	0.80000	1.00000	0.01443	0.07071	45
50		5	0.74000	0.60000	0.80000	0.01826	0.08944	37
75		5	0.14000	0.00000	0.30000	0.02739	0.13416	7
100		5	0.04000	0.00000	0.20000	0.01826	0.08944	2
Calculated Variate(A/B)								
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	B
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	50
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50
12.5		5	0.96000	0.90000	1.00000	0.01118	0.05477	50
25		5	0.90000	0.80000	1.00000	0.01443	0.07071	50
50		5	0.74000	0.60000	0.80000	0.01826	0.08944	50
75		5	0.14000	0.00000	0.30000	0.02739	0.13416	50
100		5	0.04000	0.00000	0.20000	0.01826	0.08944	50

Graphics																
<p>The graph plots the 24-hour proportion survived against concentration (%). The y-axis ranges from 0.0 to 1.0 in increments of 0.1. The x-axis ranges from 0 to 100 in increments of 20. The data points show a steep decline in survival starting at approximately 25% concentration, reaching near zero survival at 100% concentration.</p> <table border="1"> <thead> <tr> <th>Conc-%</th> <th>24h Proportion Survived</th> </tr> </thead> <tbody> <tr><td>0</td><td>1.00</td></tr> <tr><td>6.25</td><td>1.00</td></tr> <tr><td>12.5</td><td>0.96</td></tr> <tr><td>25</td><td>0.90</td></tr> <tr><td>50</td><td>0.74</td></tr> <tr><td>75</td><td>0.14</td></tr> <tr><td>100</td><td>0.04</td></tr> </tbody> </table>	Conc-%	24h Proportion Survived	0	1.00	6.25	1.00	12.5	0.96	25	0.90	50	0.74	75	0.14	100	0.04
Conc-%	24h Proportion Survived															
0	1.00															
6.25	1.00															
12.5	0.96															
25	0.90															
50	0.74															
75	0.14															
100	0.04															

CETIS Analysis Detail

Spearman-Karber: Page 1 of 4
 Report Date: 02 Oct-07 10:32 PM
 Analysis: 06-0206-0071

Americamysis 96-h Acute Survival Test

EnviroSystems, Inc.

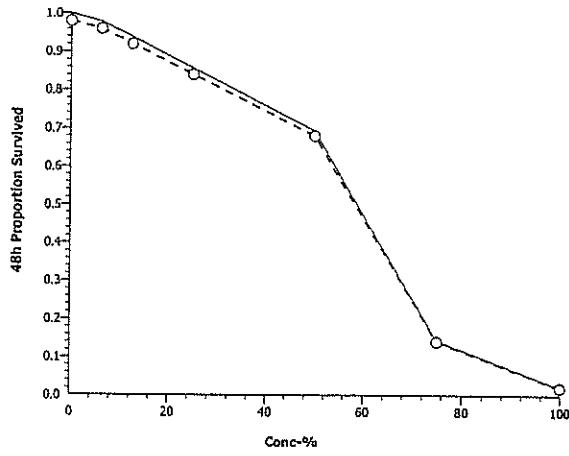
Test No:	15-7124-2542	Test Type:	Survival (96h)	Duration:	92h
Start Date:	18 Sep-07 04:10 PM	Protocol:	EPA/821/R-02-012 (2002)	Species:	Americamysis bahia
Ending Date:	22 Sep-07 11:45 AM	Dil Water:	Laboratory Seawater	Source:	ARO - Aquatic Research Organisms, N
Setup Date:	18 Sep-07 04:10 PM	Brine:	Generic commercial salts		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
48h Proportion Survived	Trimmed Spearman-Karber	01-4072-5298	01-4072-5298	02 Oct-07 10:30 PM	CETISv1.026

Spearman-Karber Options					Point Estimates		
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	EC50/LC50	95% LCL	95% UCL
Control Threshold	0.02	2.04%	1.683931	0.02625007	48.29816	42.79868	54.50429

Conc-%	Control Type	Count	Calculated Variate(A/B)						
			Mean	Minimum	Maximum	SE	SD	A	
0	Lab Water	5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
6.25		5	0.96000	0.90000	1.00000	0.01118	0.05477	48	50
12.5		5	0.92000	0.80000	1.00000	0.01708	0.08367	46	50
25		5	0.84000	0.80000	0.90000	0.01118	0.05477	42	50
50		5	0.68000	0.60000	0.80000	0.01708	0.08367	34	50
75		5	0.14000	0.00000	0.30000	0.02739	0.13416	7	50
100		5	0.02000	0.00000	0.10000	0.00913	0.04472	1	50

Graphics



CETIS Analysis Detail

Americamysis 96-h Acute Survival Test						EnviroSystems, Inc.			
Test No:	15-7124-2542	Test Type:	Survival (96h)		Duration:	92h			
Start Date:	18 Sep-07 04:10 PM	Protocol:	EPA/821/R-02-012 (2002)		Species:	Americamysis bahia			
Ending Date:	22 Sep-07 11:45 AM	Dil Water:	Laboratory Seawater		Source:	ARO - Aquatic Research Organisms, N			
Setup Date:	18 Sep-07 04:10 PM	Brine:	Generic commercial salts						
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
72h Proportion Survived	Trimmed Spearman-Karber		01-4072-5298	01-4072-5298	02 Oct-07 10:30 PM	CETISv1.026			
Spearman-Karber Options					Point Estimates				
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	EC50/LC50	95% LCL	95% UCL		
Control Threshold	0.04	2.08%	1.666745	0.02451058	46.42429	41.46905	51.97164		
Data Summary				Calculated Variate(A/B)					
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	0.96000	0.90000	1.00000	0.01118	0.05477	48	50
6.25		5	0.94000	0.90000	1.00000	0.01118	0.05477	47	50
12.5		5	0.92000	0.80000	1.00000	0.01708	0.08367	46	50
25		5	0.82000	0.80000	0.90000	0.00913	0.04472	41	50
50		5	0.66000	0.60000	0.80000	0.01826	0.08944	33	50
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50
Graphics									
72h Proportion Survived									

CETIS Analysis Detail

Spearman-Karber: Page 3 of 4
 Report Date: 02 Oct-07 10:32 PM
 Analysis: 10-7368-7169

Americamysis 96-h Acute Survival Test						EnviroSystems, Inc.			
Test No:	15-7124-2542	Test Type:	Survival (96h)			Duration:	92h		
Start Date:	18 Sep-07 04:10 PM	Protocol:	EPA/821/R-02-012 (2002)			Species:	Americamysis bahia		
Ending Date:	22 Sep-07 11:45 AM	Dil Water:	Laboratory Seawater			Source:	ARO - Aquatic Research Organisms, N		
Setup Date:	18 Sep-07 04:10 PM	Brine:	Generic commercial salts						
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version			
96h Proportion Survived	Trimmed Spearman-Karber		01-4072-5298	01-4072-5298	02 Oct-07 10:30 PM	CETISv1.026			
Spearman-Karber Options					Point Estimates				
Threshold Option	Lower Threshold	Trim Level	Mu	Sigma	EC50/LC50	95% LCL	95% UCL		
Control Threshold	0.04	4.17%	1.595651	0.02942507	39.41403	34.41920	45.13371		
Data Summary				Calculated Variate(A/B)					
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	0.96000	0.90000	1.00000	0.01118	0.05477	48	50
6.25		5	0.92000	0.80000	1.00000	0.01708	0.08367	46	50
12.5		5	0.90000	0.80000	1.00000	0.01443	0.07071	45	50
25		5	0.74000	0.40000	0.90000	0.03979	0.19494	37	50
50		5	0.48000	0.30000	0.60000	0.02236	0.10954	24	50
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50
Graphics									
96h Proportion Survived									

CETIS Analysis Detail

Comparisons: Page 3 of 4
 Report Date: 03 Oct-07 10:45 AM
 Analysis: 14-6627-3059

Americamysis 96-h Acute Survival Test							EnviroSystems, Inc.					
Test No:	15-7124-2542	Test Type:	Survival (96h)				Duration:	92h				
Start Date:	18 Sep-07 04:10 PM	Protocol:	EPA/821/R-02-012 (2002)				Species:	Americamysis bahia				
Ending Date:	22 Sep-07 11:45 AM	Dil Water:	Laboratory Seawater				Source:	ARO - Aquatic Research Organisms, N				
Setup Date:	18 Sep-07 04:10 PM	Brine:	Generic commercial salts									
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version						
24h Proportion Survived	Comparison		01-4072-5298	01-4072-5298	02 Oct-07 10:31 PM	CETISv1.026						
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp				
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		25	50	4.00	35.355	10.34%				
ANOVA Assumptions												
Attribute	Test		Statistic	Critical	P Level	Decision(0.01)						
Variances	Modified Levene		2.50904	3.52756	0.04535	Equal Variances						
Distribution	Shapiro-Wilk W		0.94805	0.91004	0.13123	Normal Distribution						
ANOVA Table												
Source	Sum of Squares		Mean Square	DF	F Statistic	P Level	Decision(0.05)					
Between	7.686626		1.281104	6	104.57	0.00000	Significant Effect					
Error	0.3430223		0.0122508	28								
Total	8.02964872		1.2933552	34								
Group Comparisons												
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)					
Lab Water		6.25	0	2.40857	> 0.0500	0.16861	Non-Significant Effect					
		12.5	0.93123	2.40857	> 0.0500	0.16861	Non-Significant Effect					
		25	2.26787	2.40857	> 0.0500	0.16861	Non-Significant Effect					
		50	5.31812	2.40857	<= 0.0500	0.16861	Significant Effect					
		75	14.9583	2.40857	<= 0.0500	0.16861	Significant Effect					
		100	17.0318	2.40857	<= 0.0500	0.16861	Significant Effect					
Data Summary												
Original Data			Transformed Data									
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD		
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026		
6.25		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026		
12.5		5	0.96000	0.90000	1.00000	0.05477	1.34683	1.24905	1.41202	0.08926		
25		5	0.90000	0.80000	1.00000	0.07071	1.25326	1.10715	1.41202	0.10794		
50		5	0.74000	0.60000	0.80000	0.08944	1.03974	0.88608	1.10715	0.09950		
75		5	0.14000	0.00000	0.30000	0.13416	0.36490	0.15878	0.57964	0.19403		
100		5	0.04000	0.00000	0.20000	0.08944	0.21975	0.15878	0.46365	0.13634		
Graphics												

CETIS Analysis Detail

Comparisons: Page 1 of 4
 Report Date: 03 Oct-07 10:45 AM
 Analysis: 06-6039-1529

Americamysis 96-h Acute Survival Test						EnviroSystems, Inc.				
Test No:	15-7124-2542	Test Type:	Survival (96h)			Duration:	92h			
Start Date:	18 Sep-07 04:10 PM	Protocol:	EPA/821/R-02-012 (2002)			Species:	Americamysis bahia			
Ending Date:	22 Sep-07 11:45 AM	Dil Water:	Laboratory Seawater			Source:	ARO - Aquatic Research Organisms, N			
Setup Date:	18 Sep-07 04:10 PM	Brine:	Generic commercial salts							
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed		Version		
48h Proportion Survived		Comparison		01-4072-5298	01-4072-5298	02 Oct-07 10:31 PM		CETISv1.026		
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp		
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		12.5	25	8.00	17.678	10.73%		
ANOVA Assumptions										
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)					
Variances	Bartlett	6.87165	16.81190	0.33288	Equal Variances					
Distribution	Shapiro-Wilk W	0.97165	0.91004	0.56281	Normal Distribution					
ANOVA Table										
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)				
Between	7.091794	1.181966	6	94.73	0.00000	Significant Effect				
Error	0.349357	0.0124770	28							
Total	7.44115105	1.1944427	34							
Group Comparisons										
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)			
Lab Water		6.25	0.46137	2.40857	> 0.0500	0.17016	Non-Significant Effect			
		12.5	1.32446	2.40857	> 0.0500	0.17016	Non-Significant Effect			
		25	3.05064	2.40857	<= 0.0500	0.17016	Significant Effect			
		50	5.76254	2.40857	<= 0.0500	0.17016	Significant Effect			
		75	14.3607	2.40857	<= 0.0500	0.17016	Significant Effect			
		100	16.817	2.40857	<= 0.0500	0.17016	Significant Effect			
Data Summary										
Original Data										
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum		
0	Lab Water	5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905		
6.25		5	0.96000	0.90000	1.00000	0.05477	1.34683	1.24905		
12.5		5	0.92000	0.80000	1.00000	0.08367	1.28585	1.10715		
25		5	0.84000	0.80000	0.90000	0.05477	1.16391	1.10715		
50		5	0.68000	0.60000	0.80000	0.08367	0.97232	0.88608		
75		5	0.14000	0.00000	0.30000	0.13416	0.36490	0.15878		
100		5	0.02000	0.00000	0.10000	0.04472	0.19137	0.15878		
Transformed Data										
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum		
0	Lab Water	5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905		
6.25		5	0.96000	0.90000	1.00000	0.05477	1.34683	1.24905		
12.5		5	0.92000	0.80000	1.00000	0.08367	1.28585	1.10715		
25		5	0.84000	0.80000	0.90000	0.05477	1.16391	1.10715		
50		5	0.68000	0.60000	0.80000	0.08367	0.97232	0.88608		
75		5	0.14000	0.00000	0.30000	0.13416	0.36490	0.15878		
100		5	0.02000	0.00000	0.10000	0.04472	0.19137	0.15878		
Graphics										

CETIS Analysis Detail

Comparisons: Page 4 of 4
 Report Date: 03 Oct-07 10:45 AM
 Analysis: 17-1111-6260

Americamysis 96-h Acute Survival Test						EnviroSystems, Inc.				
Test No:	15-7124-2542	Test Type:	Survival (96h)			Duration:	92h			
Start Date:	18 Sep-07 04:10 PM	Protocol:	EPA/821/R-02-012 (2002)			Species:	Americamysis bahia			
Ending Date:	22 Sep-07 11:45 AM	Dil Water:	Laboratory Seawater			Source:	ARO - Aquatic Research Organisms, N			
Setup Date:	18 Sep-07 04:10 PM	Brine:	Generic commercial salts							
Endpoint	Analysis Type		Sample Link	Control Link	Date Analyzed	Version				
72h Proportion Survived	Comparison		01-4072-5298	01-4072-5298	02 Oct-07 10:31 PM	CETISv1.026				
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp		
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		12.5	25	8.00	17.678	9.03%		
ANOVA Assumptions										
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)					
Variances	Bartlett	1.81772	13.27671	0.76924	Equal Variances					
Distribution	Shapiro-Wilk W	0.92593	0.88746	0.07513	Normal Distribution					
ANOVA Table										
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)				
Between	0.5387783	0.1346946	4	14.56	0.00001	Significant Effect				
Error	0.1849687	0.0092484	20							
Total	0.72374699	0.1439430	24							
Group Comparisons										
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)			
Lab Water		6.25	0.53589	2.3	> 0.0500	0.13989	Non-Significant Effect			
		12.5	1.00248	2.3	> 0.0500	0.13989	Non-Significant Effect			
		25	3.47404	2.3	<= 0.0500	0.13989	Significant Effect			
		50	6.50287	2.3	<= 0.0500	0.13989	Significant Effect			
Data Summary				Original Data				Transformed Data		
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Water	5	0.96000	0.90000	1.00000	0.05477	1.34683	1.24905	1.41202	0.08926
6.25		5	0.94000	0.90000	1.00000	0.05477	1.31423	1.24905	1.41202	0.08926
12.5		5	0.92000	0.80000	1.00000	0.08367	1.28585	1.10715	1.41202	0.12892
25		5	0.82000	0.80000	0.90000	0.04472	1.13553	1.10715	1.24905	0.06346
50		5	0.66000	0.60000	0.80000	0.08944	0.95131	0.88608	1.10715	0.09828
Graphics										

CETIS Analysis Detail

Comparisons: Page 2 of 4
 Report Date: 03 Oct-07 10:45 AM
 Analysis: 08-7717-8615

Americamysis 96-h Acute Survival Test						EnviroSystems, Inc.	
Test No:	15-7124-2542	Test Type:	Survival (96h)	Duration:	92h		
Start Date:	18 Sep-07 04:10 PM	Protocol:	EPA/821/R-02-012 (2002)	Species:	Americamysis bahia		
Ending Date:	22 Sep-07 11:45 AM	Dil Water:	Laboratory Seawater	Source:	ARO - Aquatic Research Organisms, N		
Setup Date:	18 Sep-07 04:10 PM	Brine:	Generic commercial salts				
Endpoint		Analysis Type		Sample Link	Control Link	Date Analyzed	Version
96h Proportion Survived		Comparison		01-4072-5298	01-4072-5298	02 Oct-07 10:31 PM	CETISv1.026
Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		12.5	25	8.00	17.678
MSDp							13.46%
ANOVA Assumptions							
Attribute	Test	Statistic	Critical	P Level	Decision(0.01)		
Variances	Bartlett	3.64318	13.27671	0.45644	Equal Variances		
Distribution	Shapiro-Wilk W	0.92843	0.88746	0.08574	Normal Distribution		
ANOVA Table							
Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)	
Between	1.129405	0.2823513	4	14.94	0.00001	Significant Effect	
Error	0.3780617	0.0189031	20				
Total	1.50746700	0.3012544	24				
Group Comparisons							
Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Lab Water		6.25	0.70120	2.3	>0.0500	0.2	Non-Significant Effect
		12.5	1.07604	2.3	>0.0500	0.2	Non-Significant Effect
		25	3.40158	2.3	<=0.0500	0.2	Significant Effect
		50	6.69822	2.3	<=0.0500	0.2	Significant Effect
Data Summary							
Original Data							
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	
0	Lab Water	5	0.96000	0.90000	1.00000	0.05477	1.34683
6.25		5	0.92000	0.80000	1.00000	0.08367	1.28585
12.5		5	0.90000	0.80000	1.00000	0.07071	1.25326
25		5	0.74000	0.40000	0.90000	0.19494	1.05104
50		5	0.48000	0.30000	0.60000	0.10954	0.76438
Transformed Data							
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	
0	Lab Water	5	1.24905	1.24905	1.41202	0.08926	
6.25		5	1.10715	1.10715	1.41202	0.12892	
12.5		5	1.10715	1.10715	1.41202	0.10794	
25		5	0.68472	0.68472	1.24905	0.21380	
50		5	0.57964	0.57964	0.88608	0.11210	
Graphics							



Aquatic Research Organisms

DATA SHEET

RBC a/18/07

I. Organism History

Species: AMERICAMYYSIS bahia
Source: Lab reared _____ Hatchery reared _____ Field collected _____
Hatch date 9-15-07 Receipt date _____
Lot number 091507HS Strain _____
Brood Origination Florida

II. Water Quality

Temperature 25 °C Salinity ~30 ppt DO —
pH 7.8 Hardness — ppm

III. Culture Conditions

System: RECIPE

Diet: Flake Food Phytoplankton _____ Trout Chow
Brine Shrimp Rotifers _____ Other Encaps Shrimp Diet

Prophylactic Treatments: _____

Comments: _____

IV. Shipping Information

Client: EST # of Organisms: 1000+
Carrier: _____ Date Shipped: 9-18-07

Biologist: Mark Thompson

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

RECORD OF METERS USED FOR WATER QUALITY MEASUREMENTS

STUDY: 16289	CLIENT: GILL - American Samoa
WATER QUALITIES: A bahaia	
HOURS:	0 24 48 - old 48 - new 72 96
Water Quality Station #	1 2 1 1 1 1
Initials	RAB SJ LB AK CS
Date	9/18/07 9/19/07 9/26/07 9/20/07 9/21/07 9/22/07

Water Quality Station #1	Water Quality Station #2	Comments
DO meter #	19	DO meter #
DO probe #	12	DO probe #
pH meter #	1097	pH meter #
pH probe #	50	pH probe #
S/C meter #	YS130C	S/C meter #
S/C probe #	↓	S/C probe #
Salinity meter #	↓	Salinity meter #

EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA

PARAMETER	100% Effluent	50% Effluent	Diluent - Lab Salt
TRC	<0.05		<0.05
As Received - pH (SU) @ 20°C	6.28		7.83
As Received - Salinity (ppt)	9.7		25
As Received - Dissolved Oxygen (mg/L)‡	0.7		7.1
As Received - Ammonia (pull)	-002		-003
Salinity Adjusted - pH (SU) @ 20°C	7.91	7.89	
Salinity Adjusted - Salinity (ppt)	2.6	2.6	
After Aeration - Dissolved Oxygen (mg/L)	7.5	7.5	
Salinity Adjusted - Ammonia (pull)		-004	
48 hour Ammonia (pull)	-005	-006	
48 hour pH (SU) @ 20°C	8.09	7.68	7.97

‡ - Aerate prior to mixing concentrations.

PREPARATION OF DILUTIONS

STUDY: 16289		CLIENT: G2Q CH2MH - American Samoa	
SPECIES: <i>A. bahia</i>	Day: 0	Day: 2	Comments:
Diluent: Lab Salt	Sample:	Sample:	
Concentration	Vol. Eff.	Final Vol	
LAB	0	1000	
6.25%	62.5	62.5	
12.5%	125	125	
25%	250	250	
50%	500	500	
75%	750	750	
100%	1000	1000	

Report No: 16289 SDG:
Project: Joint Cannery Outfall Effluent Monitoring-JCO0702.TW

Sample ID: Start Effluent
Matrix: Water
Sampled: 09/18/07 1330

Parameter	Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference	
Ammonia-N	16289-002	32	0.5	mg/L as N	09/19/07	09/19/07	SM 4500-NH3 G
Sample ID:	Start Diluent - Lab Salt						
Sampled:	09/18/07 1330						
Parameter	Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference	
Ammonia-N	16289-003	ND	0.1	mg/L as N	09/19/07	09/19/07	SM 4500-NH3 G
Sample ID:	Start 50% Effluent						
Sampled:	09/18/07 1330						
Parameter	Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference	
Ammonia-N	16289-004	28	0.2	mg/L as N	09/19/07	09/19/07	SM 4500-NH3 G
Sample ID:	48-Hour 100% Effluent						
Sampled:	09/20/07 1610						
Parameter	Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference	
Ammonia-N	16289-005	14	0.1	mg/L as N	09/26/07	09/26/07	SM 4500-NH3 G
Sample ID:	48-Hour 50% Effluent						
Sampled:	09/20/07 1610						
Parameter	Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference	
Ammonia-N	16289-006	6.5	0.1	mg/L as N	09/26/07	09/26/07	SM 4500-NH3 G
Sample ID:	48-Hour Diluent						
Sampled:	09/20/07 1610						
Parameter	Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference	
Ammonia-N	16289-007	ND	0.1	mg/L as N	09/26/07	09/26/07	SM 4500-NH3 G

ESI

STUDY: 16289
CLIENT: GDC
PROJECT: American Salmon Joint Tuna
TASK: Unionized Ammonia Calculations

Treatment	Lab ID	Sample			Unionized	
		Temperature Deg C	pH SU	NH3 mg/L	NH3 mg/L	
Start Effluent	16289-002	20.00	7.91	32	<	0.997
Start Diluent - Lab Salt	16289-003	20.00	7.76	0.1	<	0.002
Start 50% Effluent	16289-004	20.00	7.89	28		0.835
48-Hour 100% Effluent	16289-005	19.00	8.09	14		0.606
48-Hour 50% Effluent	16289-006	19.00	8.14	6.5		0.314
48-Hour Diluent	16289-007	19.00	7.97	0.1	<	0.003

ESI

EnviroSystems, Inc.
One Lafayette Road
P.O. Box 778
Hampton, NH 03843-0778
Telephone: 603-926-3345

SAMPLE RECEIPT RECORD

GDC

ESI STUDY NUMBER: 16289 CLIENT: CH2M - American Samoa

SAMPLE RECEIPT:

DATE: 9/18/07 TIME: 1300 BY: RAM

DELIVERED VIA: FEDEX CLIENT ESI UPS OTHER Eastern Connection

LOGGED INTO LAB:

DATE: 9/18/07 TIME: 1300 BY: RAM

SAMPLE CONDITION:

CHAIN OF CUSTODY:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
CHAIN OF CUSTODY SIGNED:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
CHAIN OF CUSTODY COMPLETE:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
SAMPLE DATE:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
SAMPLE TIME RECORDED:	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	
SAMPLE TYPE IDENTIFIED:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
CUSTODY SEAL IN PLACE:	<input type="checkbox"/> YES	<input type="checkbox"/> NA	<input checked="" type="checkbox"/> NO <small>Container sealed with tape</small>
SHIPPING CONTAINER INTACT:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
SAMPLE TEMPERATURE (AT ARRIVAL):	<u>20</u> °C		
DOES CLIENT NEED NOTIFICATION OF TEMPERATURE?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	
SAMPLE ARRIVED ON ICE:	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	

COMMENTS:

see COC

31 October 2007

Mr. Carl Goldstein
Pacific Insular Area Programs
CMD-1
Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105

Mr. Peter Peshut
American Samoa Environmental
Protection Agency
American Samoa Government
P.O. Box 368A
Pago Pago, American Samoa 96799

RE: Joint Cannery Outfall Effluent Bioassay Testing September 2007 Sampling

Enclosed are two copies of the report describing the results of the Joint Cannery Outfall bioassay testing for the September 2007 (2007 Tradewind Season) sampling. The full laboratory report is attached to our summary report. The sampling and analysis were carried out without problems. The results are similar to the past bioassay test results.

Please call us if you have any questions or comments on the enclosed report.

Sincerely,



Karen A. Glatzel

Cc: Jim Cox, COS International; Willem Martines, COS; Ken McLeod, COS; Brett Butler, StarKist Samoa; Joe Carney, StarKist Samoa; Tim Ruby, Del Monte; Rob Darby, CH2M HILL

Encl: Bioassay Testing – Joint Cannery Outfall Effluent September 2007 Tradewind Season Sampling

CH2MHILL TRANSMITTAL

To: USEPA-Region 9

From: Steve Costa

Attn: Carl Goldstein

Date: November 2, 2007

Re: Pago Pago Harbor SedTox Study

We Are Sending You:

Method of shipment: USPS

Attached

Under separate cover via

Shop Drawings

Documents

Tracings

Prints

Specifications

Catalogs

Copy of letter

Other:

Quantity	Description
2	Completed Copies of Element 2 Final Report

If the material received is not as listed, please notify us at once.

Remarks:

Carl, finally finished the missing Appendix and the CD burns – enclosed are USEPA's copies

Copy To:

